

# PATENT COOPERATION TREATY

From the  
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

Rec'd PCT/PTO 20 JAN 2005  
PCT

To:

Menes, Catherine  
ETUDES ET PRODUCTIONS SCHLUMBERGER  
1, rue Henri Becquerel  
BP 202  
F-92142 Clamart Cedex  
FRANCE

NOTIFICATION OF TRANSMITTAL OF  
THE INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT  
(PCT Rule 71.1)

Date of mailing  
(day/month/year) 09.11.2004

Applicant's or agent's file reference  
WO 21.1045

WL-PL

## IMPORTANT NOTIFICATION

International application No.  
PCT/EP 03/50262

International filing date (day/month/year)  
25.06.2003

Priority date (day/month/year)  
23.07.2002

Applicant  
SERVICES PETROLIERS SCHLUMBERGER

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.
4. **REMINDER**

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

The applicant's attention is drawn to Article 33(5), which provides that the criteria of novelty, inventive step and industrial applicability described in Article 33(2) to (4) merely serve the purposes of international preliminary examination and that "any Contracting State may apply additional or different criteria for the purposes of deciding whether, in that State, the claimed inventions is patentable or not" (see also Article 27(5)). Such additional criteria may relate, for example, to exemptions from patentability, requirements for enabling disclosure, clarity and support for the claims.

Name and mailing address of the international preliminary examining authority:



European Patent Office - P.B. 5818 Patentlaan 2  
NL-2280 HV Rijswijk - Pays Bas  
Tel. +31 70 340 - 2040 Tx: 31 651 epo nl  
Fax: +31 70 340 - 3016

Authorized Officer

Adam, G

Tel. +31 70 340-4133



# PATENT COOPERATION TREATY



## PCT

### INTERNATIONAL PRELIMINARY EXAMINATION REPORT (PCT Article 36 and Rule 70)

Applicant's or agent's file reference <b>WO 21.1045</b>	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)	
International application No. <b>PCT/EP 03/50262</b>	International filing date ( <i>day/month/year</i> ) <b>25.06.2003</b>	Priority date ( <i>day/month/year</i> ) <b>23.07.2002</b>
International Patent Classification (IPC) or both national classification and IPC <b>G01F1/15</b>		
Applicant <b>SERVICES PETROLIERS SCHLUMBERGER</b>		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 6 sheets, including this cover sheet.  
  
☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).  
  
 These annexes consist of a total of 5 sheets.

3. This report contains indications relating to the following items:
  - I ☒ Basis of the opinion
  - II ☐ Priority
  - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
  - IV ☐ Lack of unity of invention
  - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
  - VI ☐ Certain documents cited
  - VII ☐ Certain defects in the international application
  - VIII ☐ Certain observations on the international application

Date of submission of the demand  <b>17.02.2004</b>	Date of completion of this report  <b>09.11.2004</b>
Name and mailing address of the international preliminary examining authority:   <b>European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016</b>	Authorized Officer  <b>Pflugfelder, G</b>  Telephone No. +31 70 340-2890  

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. **PCT/EP 03/50262**

**I. Basis of the report**

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

**Description, Pages**

1-27 as originally filed

**Claims, Numbers**

1-17 received on 26.10.2004 with letter of 25.10.2004

**Drawings, Sheets**

1/7-7/7 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).  
☐ the language of publication of the international application (under Rule 48.3(b)).  
☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.  
☐ filed together with the international application in computer readable form.  
☐ furnished subsequently to this Authority in written form.  
☐ furnished subsequently to this Authority in computer readable form.  
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.  
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:  
☐ the claims, Nos.:  
☐ the drawings, sheets:

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. **PCT/EP 03/50262**

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5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Yes: Claims	2,4-6,9,10,12-17
	No: Claims	1,3,7,8,11
Inventive step (IS)	Yes: Claims	
	No: Claims	1-17
Industrial applicability (IA)	Yes: Claims	1-17
	No: Claims	

2. Citations and explanations

**see separate sheet**

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

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International application No. PCT/EP 03/50262

Reference is made to the following documents:

- D1: DE 100 60 621 A (DENSO CORP) 13 June 2001 (2001-06-13)
- D2: WO 99/49322 A (CONTINENTAL TEVES AG & CO OHG ;LOHBERG PETER;  
ZYDEK MICHAEL ) 30 September 1999 (1999-09-30)
- D3: US-A-3 636 767 (DUFFY LAURENCE SIDNEY) 25 January 1972 (1972-01-25)
- D4: US-A-3 455 162 (MICHENER ROBERT ET AL) 15 July 1969 (1969-07-15)
- D5: EP-A-1 074 843 (BOSCH GMBH ROBERT) 7 February 2001 (2001-02-07)
- D6: DE 196 18 867 A (BOSCH GMBH ROBERT) 27 February 1997 (1997-02-27)

**Re Item V**

**Reasoned statement with regard to novelty, inventive step or industrial  
applicability; citations and explanations supporting such statement**

**1. Novelty**

The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 1, is not new in the sense of Article 33(2) PCT.

2.1 The document D1 (see column 6, line 15 - column 8, line 23; figures 1, 2, 7i, 8i, 9i, 10i, 11i, 12i) discloses (the references in parentheses applying to this document):

- A device ("Rotationserfassungsvorrichtung (2)") for measuring the speed and direction of rotation of an object ("Rotationsmagnet (1)"), near to which it is placed; said device comprising:
  - a magnetic detection device ("Magnetsensoren (3,4)") that delivers, in response to a rotation of the object (1) generating a magnetic field variation, signals representative of its speed and its direction of rotation,
  - a conductor ("Signalleitung (13b)...(mit Massenanschluss verbunden)") intended to be connected to a power source to supply current to the magnetic detection device (3,4) at least,
  - current receptor means (12) placed between the magnetic detection device (3,4) and the conductor (13b) that create, from signals coming from the magnetic detection device (3,4), a modulation of the current (Is) flowing in the conductor (13b), said modulated current (Is) reflecting both the speed and the direction of rotation of the object (1); wherein
- the frequency of the modulated current reflects the speed of the object, and

- the form of the modulated current reflects the direction of rotation of said object.

In the same way D2 see passages as cited in the search report could be used against novelty of claim 1.

2.2 Dependent claims 3,7,8,11 are also not novel:

- claim 3: D1 (see passages as cited above) discloses a magnetic detection device providing two pairs of signals out of phase;
- claim 7: D1 (see passages as cited above) discloses a "digital sensor" providing signals representative of speed and direction of rotation;
- claim 8: D1 (see passages as cited above) discloses different "cyclic ratios" of the modulated current depending on the direction of rotation;
- claim 11: D1 (see passages as cited above) discloses means of mixing providing a speed / direction signal controlling the output current;

## **2. Inventive step**

Dependent claims 2, 4-6,9,10,12-17 do not involve an inventive step:

- claim 2: the use of a resistor and a commutation element as current receptor is common knowledge in the field and not inventive;
- claims 4,5,9: the use of two comparators for two thresholds is in the given context well known and not inventive;
- claim 6: the representation of rotation direction information by the chosen time axis symmetry is well known and not inventive;
- claim 10: the *switchover* for encoding the direction is well known and not inventive;
- claim 12: the use of *logic means* for the mixing means is common knowledge;
- claim 13,14: the choice of the material for the enclosure is standard and as such dictated by the concrete environmental situation and the requirements of the measurement;
- claim 15: the use of a second conductor is e.g. known from D1;
- claim 16: the use of a non-magnetic propeller being equipped with a magnet as the rotating object is also well known in the related application field and not inventive;
- claim 17: the placement of propeller and measuring device in the same line is well known and not inventive.

## **3. Industrial Applicability**

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

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International application No. PCT/EP 03/50262

The claimed invention meets the requirement of Article 33(4) PCT of industrial applicability.

**4. Further remarks**

- The independent claim 1 is not in the two-part form in accordance with Rule 6.3(b) PCT, with those features known in combination from the prior art (document D1) being placed in the preamble (Rule 6.3(b)(I) PCT) and with the remaining features being included in the characterising part (Rule 6.3(b)(ii) PCT).
- Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the documents D1,D2 is not mentioned in the description, nor are these documents identified therein.

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CLAIMS

1. Device for measuring the speed and direction of rotation of an object (3), near to which it is placed, said device comprising:

- a magnetic detection device (2) that delivers, in response to a rotation of the object (3) generating a magnetic field variation, signals representative of its speed and its direction of rotation,

- a conductor (4) intended to be connected to a power source to supply current to the magnetic detection device (2) at least,

- current receptor means (6) placed between the magnetic detection device (2) and the conductor (4) that create, from signals coming from the magnetic detection device (2), a modulation of the current (Iout) flowing in the conductor (4),

wherein,

- the frequency of the modulated current (Iout) or the number of transitions that it has reflects the speed of the object (3); and
- the form of said modulated current (Iout) reflects the direction of rotation of said object (3).

2. Device for measuring the speed and direction of rotation of an object (3) according to claim 1, characterised in that the current receptor means (6) comprise at least one series assembly (61, 62) formed of a resistor (R1, R2) and a commutation element (C5).

3. Device for measuring the speed and direction of rotation of an object (3) according to claim 1 or 2,

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characterised in that the magnetic detection device (2) is a linear sensor delivering two pairs of signals out of phase with each other, said signals being relative to the angular position of the object.

4. Device for measuring the speed and direction of rotation of an object (3) according to claim 3, characterised in that it comprises two comparators (C1, C2), the input of each receiving the signals of a pair, the output of each comparator (C1, C2) being connected to the conductor (4) via a resistor (R1, R2) of a series assembly, the two resistors (R1, R2) having different values.

5. Device for measuring the speed and direction of rotation of an object (3) according to claim 4, characterised in that each comparator (C1, C2) includes a commutation element (Q5) for the current receptor means (6).

6. Device for measuring the speed and direction of rotation of an object (3) according to any of claims 1 to 5, characterised in that the modulated current (Iout) has a first asymmetric form when the object turns in one direction and the same form but seen in a mirror when the object (3) turns in the other direction.

7. Device for measuring the speed and direction of rotation of an object (3) according to claim 1 or 2, characterised in that the magnetic detection device (2) is a digital sensor delivering a signal representative of the speed and a signal representative of the direction of rotation of the object.

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8. Device for measuring the speed and direction of rotation of an object (3) according to any of claims 1 to 3, 7, characterised in that the modulated current (Iout) has a cyclic ratio greater than a predetermined threshold when the object (3) turns in one direction and a cyclic ratio less than the predetermined threshold when the object (3) turns in the other direction.

9. Device for measuring the speed and direction of rotation of an object (3) according to claim 8 linked to any of claims 1 to 3, characterised in that it comprises two comparators (C1, C2), the input of each receiving the signals of a pair, means of encoding (50) the direction of rotation of the object, the input of which is connected to the output of the comparators (C1, C2), means of mixing (51), the input of which is connected to the output of the comparators (C1, C2) and to the output of the means of encoding (50), the output of the means of mixing (51) delivering a unique signal (S) reflecting the speed and direction of rotation of the object (3), said unique signal controlling the current receptor means (6).

10. Device for measuring the speed and direction of rotation of an object (3) according to claim 9, characterised in that the means of encoding (50) the direction of rotation comprises a switchover D.

11. Device for measuring the speed and direction of rotation of an object (3) according to claim 8 linked to claim 7, characterised in that it comprises, means of mixing (83), the input of which is connected to the magnetic detection device (80) and the output of which delivers a unique signal (S) reflecting the speed and

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direction of rotation of the object (3), said unique signal controlling the current receptor means (6).

12. Device for measuring the speed and direction of rotation of an object (3) according to any of claims 9 to 11, characterised in that the means of mixing (51, 83) are formed by a circuit based on logic gates (60 to 65, 800 to 805).

13. Device for measuring the speed and direction of rotation of an object (3) according to any of claims 1 to 12, characterised in that the magnetic detection device (3, 80), the conductor (4) and the current receptor means (6) at least are encapsulated in an enclosure (1) made out of non-magnetic material, the conductor (4) being accessible from the exterior of said enclosure (1).

14. Device for measuring the speed and direction of rotation of an object (3) according to claim 13, characterised in that the enclosure (1) is formed out of metal such as titanium or stainless steel.

15. Device for measuring the speed and direction of rotation of an object (3) according to any of claims 1 to 14, characterised in that the magnetic detection device (3, 80) is connected to another conductor (5) for its power supply, said other conductor (5) coming into electrical contact with the enclosure (1).

16. Device for measuring the speed and direction of rotation of an object (3) according to any of claims 1 to 15, characterised in that it further comprises an object (3) in the form of a non-magnetic propeller (30) integral with at least one magnet (31).

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17. Device for measuring the speed and direction of rotation of an object (3) according to claim 16, characterised in that the propeller (30) and the measuring device are in the same line as each other, along the axis of the propeller.

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